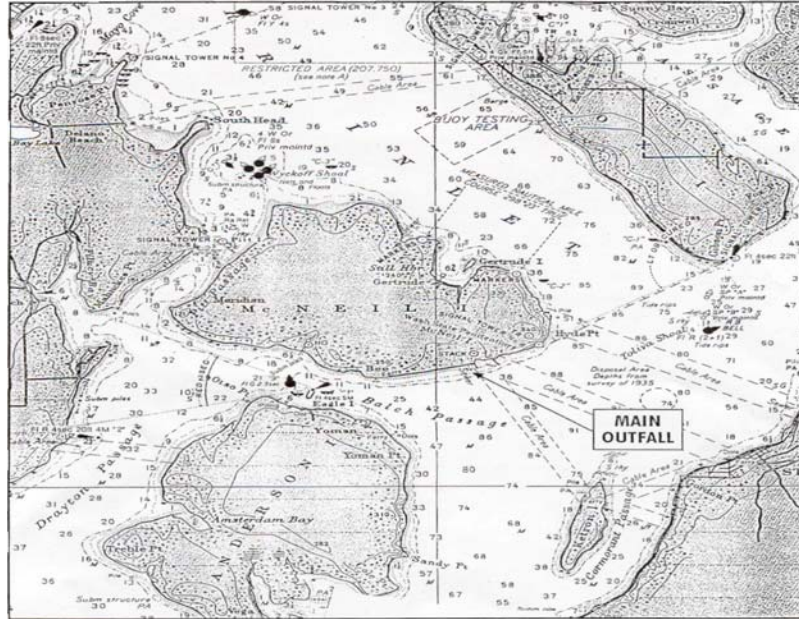


# FACT SHEET FOR NPDES PERMIT WA-004000-2

## McNEIL ISLAND CORRECTION CENTER



The fact sheet is a companion document to the draft National Pollutant Discharge Elimination System (NPDES) Permit for the McNeil Island Correction Center Wastewater Treatment Plant (WWTP). The fact sheet explains the nature of the proposed discharge, the Department of Ecology's decision on limiting the pollutants in the waste water, and the regulatory and technical basis for those decisions. The fact sheet and draft permit are available for review (see [Appendix A—Public Involvement](#) for more detail on the public notice procedures). A glossary of terms used in the fact sheet and permit are included in [Appendix B—Glossary](#).

GENERAL INFORMATION	
Applicant	Department of Corrections
Facility Name and Address	McNeil Island Correction Center (MICC) MICC Wastewater Treatment Plant McNeil Island, WA 98388
Type of Treatment	Complete Mix Activated Sludge
Discharge Location	Puget Sound Latitude: 122° 40' 12" N Longitude: 46° 11' 48" W
Water Body ID Number	WA-PS-0290

## TABLE OF CONTENTS

INTRODUCTION .....	4
BACKGROUND INFORMATION .....	5
DESCRIPTION OF THE FACILITY .....	5
Collection System Status.....	5
Treatment Processes.....	6
Discharge Outfall.....	8
Residual Solids.....	8
PERMIT STATUS.....	8
SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT .....	8
WASTEWATER CHARACTERIZATION .....	10
PROPOSED PERMIT LIMITATIONS.....	11
DESIGN CRITERIA .....	11
TECHNOLOGY-BASED EFFLUENT LIMITATIONS .....	12
SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS .....	13
Numerical Criteria for the Protection of Aquatic Life.....	13
Numerical Criteria for the Protection of Human Health.....	13
Narrative Criteria .....	13
Antidegradation.....	13
Critical Conditions .....	14
Mixing Zones .....	14
Description of the Receiving Water.....	14
Surface Water Quality Criteria .....	14
Consideration of Surface Water Quality-based Limits for Numeric Criteria .....	15
Whole Effluent Toxicity .....	16
Human Health .....	18
Sediment Quality.....	17
GROUND WATER QUALITY LIMITATIONS.....	18
COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED 2-26-93.....	19
MONITORING REQUIREMENTS.....	19
LAB ACCREDITATION .....	19
OTHER PERMIT CONDITIONS .....	20
REPORTING AND RECORDKEEPING .....	20
PREVENTION OF FACILITY OVERLOADING .....	20
OPERATION AND MAINTENANCE (O&M).....	20
RESIDUAL SOLIDS HANDLING.....	20
PRETREATMENT .....	20
Federal and State Pretreatment Program Requirements .....	20
Wastewater Permit Required .....	21

Duty to Enforce Discharge Prohibitions .....	21
Support by the Department for Developing Partial Pretreatment Program by POTW .....	22
OUTFALL EVALUATION .....	22
GENERAL CONDITIONS .....	22
PERMIT ISSUANCE PROCEDURES .....	22
PERMIT MODIFICATIONS .....	22
RECOMMENDATION FOR PERMIT ISSUANCE .....	22
REFERENCES FOR TEXT AND APPENDICES.....	23
APPENDIX A--PUBLIC INVOLVEMENT INFORMATION .....	24
APPENDIX B--GLOSSARY .....	25
APPENDIX C--TECHNICAL CALCULATIONS .....	30

## INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the Wastewater Discharge Permit Program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A—Public Involvement of the fact sheet for more detail on the public notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D—Response to Comments.

## **BACKGROUND INFORMATION**

### *DESCRIPTION OF THE FACILITY*

In 1870, the United States Federal Government purchased about 25 acres on McNeil Island to establish a territorial prison, which opened in 1875. In subsequent years, federal ownership expanded to include an “honor farm” and a surface water collection and retention system. By 1931 the federal government had acquired the entire 4,445-acre island, and McNeil Island was designated as a federal penitentiary. During the 1980’s, the federal government closed their penitentiary, and deeded McNeil Island to Washington State for use as a prison and a wildlife refuge.

Today the State of Washington operates the McNeil Island Corrections Center (MICC) on the site of the original territorial prison, and the Special Commitment Center (SCC, a Department of Social and Health Services facility) at the North Complex, formerly the site of the federal honor farm. Additionally, there are a number of single family residences which are used by Corrections for staff housing.

The McNeil Island wastewater collection system operates as three distinct drainage basins: the main institution (MICC), the North Complex (SCC and some Corrections maintenance facilities), and the staff housing area (near Still Harbor). MICC is the largest concentration of human activity on the Island. The prison includes laundry and dry cleaning operations, a furniture manufacturing plant, vehicle maintenance facilities, and a meat packing plant. MICC has housed 1,500 inmates, 650 staff, and 200 island residents.

The original McNeil Island wastewater treatment facility (WWTF) was constructed in 1971. It consisted of a headworks channel with comminutor, a 150-foot diameter aeration basin, a 35-foot diameter secondary clarifier, a chlorine contact basin, two sludge-drying beds, and an outfall to Puget Sound.

In 1991, the WWTF was converted to a Sequencing Batch Reactor (SBR), essentially at the same site as the 1971 plant. As a part of the 1991 construction project, the original secondary clarifier was converted to an aerobic digester, the sludge drying beds were retained for usage, the aeration basin was abandoned in place, and three SBR basins were constructed.

In 2003, the SBR was converted to a conventional activated sludge treatment process in order to treat the flows and loadings associated with projected future inmate populations. Two of the SBR basins were converted to activated sludge basins and the third basin was converted into an additional aerobic digester. Two new secondary clarifiers were constructed, plant control systems were upgraded, the UV-disinfection system was upgraded, and the primary lift station was substantially redeveloped.

### **COLLECTION SYSTEM STATUS**

The wastewater collection system at the Main Institution was originally constructed in the early 1900s. Apparently this system also provided drainage for storm water because a construction project in 1971 separated a part of the stormwater drainage system from the

remainder of the collection system. All waste water flows by gravity to a pump station. The waste water is then pumped to the WWTP. This pump station has an overflow to Puget Sound and no records exist for frequency or duration of overflows.

The wastewater collection system on McNeil Island is divided into three individual drainage basins: the Main Institution (MICC), the North Complex (SCC), and residential housing near Still Harbor. These areas are separated by hills ranging in height from 140 to over 200 feet.

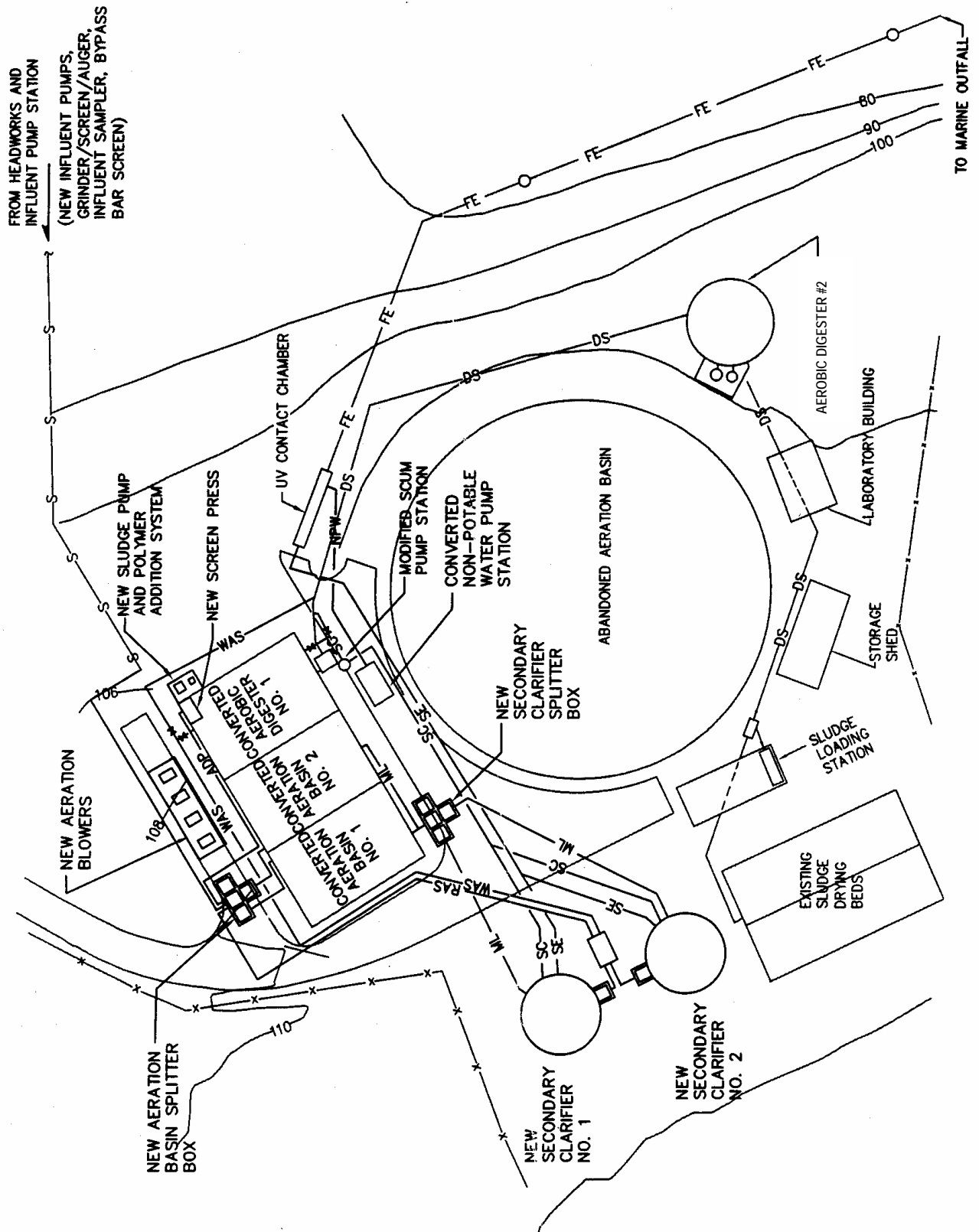
The Main Institution collection system consists of approximately 8200 feet of gravity sewer pipe ranging in size from 6 inches to 18 inches in diameter.

The North Complex collection system serves the Department of Social and Health Services Special Commitment Center and buildings used by the Department of Corrections for facilities maintenance. Wastewater in this area flows through 8- to 12-inch pipes by gravity sewer to the fenced North Complex pump station site. There the flow goes through a screen chamber for removal of solids such as rags and plastics which may plug the pumps.

The Still Harbor Area, which housed about 22 residence, is serviced by a wastewater collection system which was installed in the late fall and winter of 1995-1996. Waste water from the residence flows by gravity through 8-inch diameter PVC pipes to a lift station located about 1000 feet southeast of the Still Harbor Access Pier, adjacent to Still Harbor Road. Raw sewage is pumped 2,500 feet through a 4-inch diameter PVC force main, in the same trenches the 6-inch force main which originates at the North Complex pump station. The waste water then flows by gravity through the Main Institution collection system to the Main Institution lift station.

#### TREATMENT PROCESSES

The headworks and influent pump station discharge to the wastewater treatment facility (WWTF) where it flows through the WWTF to the effluent outfall. Influent wastewater is to the aeration basin splitter box where influent wastewater is contacted and mixed with the return activate sludge and then splits equally between the two aeration basins. Flows entering each basin pass through three selector zones designed to promote rapid uptake of soluble substrate, yielding mixed liquor with good settling characteristics. A fine bubble diffusion system is used to supply air to the two aeration basins and the aerobic digester relies on mechanical mixers. Effluent from the activated sludge aeration basin flows by gravity to a splitter box that divides flows equally among the two 30-foot diameter secondary clarifiers. The return activated sludge (RAS) underflow from the secondary clarifiers is pumped back to the aeration basin splitter box using two submersible centrifugal pumps each located in a wet well sharing a common wall with each clarifier. Waste activated sludge (WAS) is drawn off of the RAS discharge line and pumped to the aerobic digester. Flow measurement of the RAS and WAS is accomplished by using magnetic flow meters on the centrifugal pump discharge lines. Scum from the secondary clarifiers is discharged to the submersible scum pump station where it is pumped to the aerobic digester. Clarified effluent flows by gravity from the secondary clarifier to the ultraviolet (UV) disinfection channel and the effluent outfall.



## DISCHARGE OUTFALL

Secondary treated and UV disinfected effluent discharges through the present outfall and diffuser to Puget Sound (latitude 122° 40' 12" N; longitude 46° 11' 48" W) from the facility via a 1,130-foot outfall and diffuser offshore. The depth of the diffuser terminus is approximately 58 feet MLLW. The diffuser section consists of two 8-inch diameter ports, 18.4 feet apart from the centerline—one facing northeast and the other facing the southwest.

## RESIDUAL SOLIDS

The treatment facilities remove solids during the treatment of the waste water at the headworks (grit and screenings), and at the primary and secondary clarifiers, in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste at the local landfill. Solids removed from the clarifier are treated and land-applied under a permit from the Tacoma-Pierce County Health District.

The sludge thickening system is installed to thicken the sludge to 4%. The sludge thickening system consists of thickening screw press, polymer addition system, and a progressive cavity pump, which recirculates sludge to the screen press and pump to Aerobic Digester. Sludge from Digester No. 1 is pumped to Digester No. 2. Sludge from Digester No. 2 is pumped using a pre-existing sludge pump station to the pre-existing sludge loading station for land application at the sludge application site.

## PERMIT STATUS

The previous permit for this facility was issued on February 26, 1993. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD<sub>5</sub>), Total Suspended Solids (TSS), pH, Fecal and Coliform Bacteria.

Corrections submitted an application for permit renewal for the 1993 permit in August of 1997. Ecology administratively extended that permit on March 31, 1998. Corrections submitted a new application for permit renewal that reflected the change in plant operations from Sequencing Batch Reactor to a conventional activated sludge treatment process on December 8, 2003. That application was accepted by the Department (Ecology) on December 9, 2003.

## SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility received its last inspection on April 7, 2004. A Class II compliance inspection with sampling was conducted on July 7, 2004. Effluent samples were split to determine the compatibility of Ecology and McNeil Island Wastewater Treatment Plant Laboratory results and sampling methods. All inspection reports are in the facility's record file at the Northwest Regional Office of the Department.



The MICC WWTP has been operating under a 1993 NPDES permit from February 26, 1993 to the present. In August 1997, the Department of Corrections submitted an NPDES permit application to Ecology in anticipation of the 1993 permit's expiration date of February 26, 1998. Ecology issued MICC a permit extension dated March 31, 1998, which stated the permit renewal would be delayed until the year 2001.

On June 26, 1997, Corrections submitted for Ecology's approval the final Wastewater Treatment Facility Engineering Report prepared by Gray & Osborne, Inc. for a treatment plant upgrade. Ecology approved this report for the upgrade on November 5, 1997. Amendment One was submitted to Ecology on March 1, 2002, for approval and was subsequently approved. The plant upgrade was substantially complete by June 2003, with ongoing effort to integrate the new components and attain smooth operation of the renovated plant. At Ecology's request, Corrections submitted another NPDES application for the MICC plant on December 4, 2003.

Over the last five years, there have been a number of violations of the 1993 permit, based on discharge monitoring reports (DMRs) submitted to the Department and inspections conducted by the Department. Some of these violations are attributable to the transition of the plant from old to new components during the renovation project, and to determine the optimum process operation parameters for the new plant. Most of the violations of the influent limits were due to problems with the location of the influent sampling tube. In addition, the new plant was designed to handle a higher influent loading for BOD and TSS, but has been operating under the old plant's permit. Since July 2004, the renovated plant has been meeting the 1993 permit effluent limits with very few exceptions.

On January 20, 2004, a Notice of Penalty was issued to the Department of Corrections for the falsification of discharge monitoring reports (DMR). Ecology found numerous discrepancies between lab reports, bench sheets and DMRs within the time period of August 1, 1999 through July 31, 2002. The discrepancies included at least 20 of the 36 months reviewed. Based on the evidence gathered, the reports from the McNeil Island Correctional Center had been falsified and therefore testing was misrepresented for at least the three-year period investigated. One operator had been found to have recorded the false information on the DMRs. This operator is no longer employed at the Department of Corrections, and a new quality assurance program has been implemented at the facility. The operator's wastewater certification was also revoked for a three-year period.

Since 2000 the Permittee has had numerous violations of its permit, based on Discharge Monitoring Reports (DMR's) submitted to the Department and inspections conducted by the Department. The table below shows effluent and influent violations over the last five years.

**Facility's Compliance Record from January 2000 through December 2004**

Parameter	Compliance Record
Influent Flow	There were 20 influent flow violations.
Influent BOD <sub>5</sub>	There were 33 influent BOD violations.
Influent TSS	There were 16 influent violations.
Effluent TSS	There were 9 violations.
Effluent BOD <sub>5</sub>	There were 7 effluent BOD <sub>5</sub> violations.
Fecal Coliform Bacteria	There were 8 effluent fecal coliform bacteria violations.
pH	There were 7 effluent pH violations.
TSS % Removal	There were 2 violations.
BOD 5-day Removal	There were 2 violations.

During the past five-year history of the previous permit, the Permittee has been out of compliance on numerous occasions as outlined above. On January 20, 2004, a Notice of Penalty was issued to the Washington State Department of Corrections for the falsification of discharge monitoring reports. The penalty was based on the Department findings. They include the following:

Through the review of records for the time period of August 1, 1999, through July 31, 2002, from lab reports, bench sheets, and discharge monitoring reports (DMR), discrepancies were discovered. The discrepancies included at least 20 of the 36 months reviewed. Based on the evidence gathered during an investigatory period of three years, the McNeil Island Correctional Center had been falsifying and misrepresenting testing for at least the three-year period investigated.

Some of the discrepancies occurred when lab reports or bench sheets showed results that were significantly different from the DMR.

**WASTEWATER CHARACTERIZATION**

The concentration of pollutants in the discharge was reported in the NPDES application and in Discharge Monitoring Reports. Based on monthly average data from the effluent is characterized as follows:

**Table 1: Wastewater Characterization**

Parameter	Concentration
BOD (mg/l)	9.6
TSS (mg/l)	9.0
pH	6.7-7.1
Fecal Coliform Bacteria (#/100ml)	2
Total Ammonia (as N).(mg/l)	0.05

## PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the surface water quality standards (Chapter 173-201A WAC), ground water standards (Chapter 173-200 WAC), sediment quality standards (Chapter 173-204 WAC), or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances, the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

### DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are taken from The Engineering Report - Amendment No. 1 for the Wastewater Treatment Facility Improvements, prepared by Gray & Osborne, Inc. and are as follows:

**Table 2: Design Standards for McNeil Island Correction Center WWTP.**

Parameter	Design Quantity
Monthly average flow (max. month)	0.45 MGD
Instantaneous peak flow	1.75 MGD
BOD <sub>5</sub> influent loading	1350 lb./day
TSS influent loading	1200 lb./day
Design population equivalent	2212

### TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and state regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (state). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal waste water.

The following technology-based limits for pH, fecal coliform, BOD<sub>5</sub>, and TSS are taken from Chapter 173-221 WAC:

**Table 3: Technology-based Limits.**

Parameter	Limit
pH	Shall be within the range of 6 to 9 standard units
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD <sub>5</sub> (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
BOD (mass)	Average Monthly Limit = 112.59 lb/day Average Weekly Limit = 168.89 lb/day
TSS (mass)	Average Monthly Limit = 112.59 lb/day Average Weekly Limit = 168.89 lb/day

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent BOD mass loadings (lbs/day) were calculated as the maximum monthly design flow (0.45 MGD) x concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 112.59 lbs/day.

The weekly average effluent mass loading for BOD<sub>5</sub> was calculated as the maximum monthly design flow (0.45 MGD) x concentration limit (45 mg/L) x 8.34 (conversion factor) = mass limit 168.89 lbs/day.

Monthly effluent TSS mass loadings (lbs/day) were calculated as the maximum monthly design loading (0.45 lbs./day) x concentration limit (30 mg/L) x 8.34 (conversion factor) = mass limit 112.59 lbs/day.

The weekly average effluent TSS mass loading is calculated as maximum monthly design flow (0.45 MGD) x concentration limit (45 mg/L) x 8.34 (conversion factor) = mass limit 168.9 lbs/day.

### *SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS*

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State surface water quality standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Water quality-based effluent limitations may be based on an individual wasteload allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

### NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the Washington State's water quality standards for surface waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water while remaining protective of aquatic life. Numerical criteria set forth in the water quality standards are used along with chemical and physical data for the waste water and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

### NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The state was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA 1992). These criteria are designed to protect humans from cancer and other diseases and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

### NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the state of Washington.

### ANTIDegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

#### CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses.

#### MIXING ZONES

The water quality standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

#### DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Puget Sound which is designated as a Class AA marine receiving water in the vicinity of the outfall. Other nearby point source outfalls include Steilacoom STP. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

#### SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

**Table 6: Water Quality Criteria for Class AA Waters**

Parameter	Class AA WQ Criteria
Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	7 mg/L minimum
Temperature	13 degrees Celsius maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

#### CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of UM model. The dilution factors have been determined to be (from Appendix C):

	Acute	Chronic
Aquatic Life	140	1043
Human Health, Carcinogen		1043
Human Health, Non-carcinogen		1043

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

BOD<sub>5</sub>—This discharge, with technology-based limitations, results in a small amount of BOD loading relative to large amounts of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature—Under critical conditions, there is no predicted violation of the water quality standards for surface waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH—Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the water quality standards for surface waters.

Fecal Coliform—The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 1043:1.

Under critical conditions there is no predicted violation of the water quality standards for surface waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants—Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent limits defined in regulation are not exempted from meeting the water quality standards for surface waters or from having surface water quality-based effluent limits.

The following toxics were determined to be present in the discharge: ammonia, heavy metals, and a few pollutants from EPA's list of 126 priority pollutants. A reasonable potential analysis (see Appendix C) was conducted on these parameters to determine whether or not effluent limitations would be required in this permit.

The determination of the reasonable potential for all detected priority pollutants and ammonia to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The parameters used in the critical condition modeling are as follows:

acute dilution factor	140:1
chronic dilution factor	1043:1

#### WHOLE EFFLUENT TOXICITY

The water quality standards for surface waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the waste water in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.



Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their waste water with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

In accordance with WAC 173-205-040, the Permittee's effluent has been determined to have the potential to contain toxic chemicals. The proposed permit contains requirements for whole effluent toxicity testing as authorized by RCW 90.48.520 and 40 CFR 122.44 and in accordance with procedures in Chapter 173-205 WAC. The proposed permit requires the Permittee to conduct toxicity testing for one year in order to characterize both the acute and chronic toxicity of the effluent.

If acute or chronic toxicity is measured during effluent characterization at levels that, in accordance with WAC 173-205-050(2)(a), have a reasonable potential to cause receiving water toxicity, then the proposed permit will set a limit on the acute or chronic toxicity. The proposed permit will then require the Permittee to conduct WET testing in order to monitor for compliance with either an acute toxicity limit, a chronic toxicity limit, or both an acute and a chronic toxicity limit. The proposed permit also specifies the procedures the Permittee must use to come back into compliance if the limits are exceeded.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC<sub>50</sub>, EC<sub>50</sub>, IC<sub>25</sub>, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication #WQ-R-95-80, *Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria*, which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications Distribution Center at (360) 407-7472 for a copy. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted in response to rapid screening tests fails to meet the performance standards in WAC 173-205-020 "whole effluent toxicity performance standard."

When the WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water toxicity, the Permittee will not be given WET limits and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that toxicity has not increased in the effluent.

#### HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge does not contain chemicals of concern based on existing data or knowledge. The discharge will be reevaluated for impacts to human health at the next permit reissuance.

A determination of the discharger's potential to cause an exceedance of the water quality standards was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001) and the Department's *Permit Writer's Manual* (Ecology Publication 92-109, July 1994).

#### SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger's characteristics and effluent characteristics that this discharge has no reasonable potential to violate the sediment management standards.

#### GROUND WATER QUALITY LIMITATIONS

The Department has promulgated ground water quality standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

*COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT ISSUED February 26, 1993*

**Table7: Comparison of Previous and New Limits.**

The first value is the monthly average limit; the second value is the maximum weekly limit.

Parameter	Existing Limits Technology-based	Proposed Limits Technology-based	Final Permit Limit
BOD <sub>5</sub>	30, 45 mg/L 95, 143 lb/day	30, 45 mg/L 113, 169 lb/day	30, 45 mg/L 113, 169 lb/day
BOD % Removal	At least 85%	At least 85%	At least 85%
TSS	30, 45 mg/L 95, 143 lb/day	30, 45 mg/L 113, 169 lb/day	30, 45 mg/L 113, 169 lb/day
TSS % Removal	At least 85%	At least 85%	At least 85%
pH	6.0 - 9.0	6.0 - 9.0	6.0 - 9.0
Fecal Coliform	200/100 ml 400/100 ml	200/100 ml 400/100 ml	200/100 ml 400/100 ml

### MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current state and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 1994) for a Complete Mix Activated Sludge Treatment Process.

### LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, Accreditation of Environmental Laboratories. The laboratory that performs testing for this facility is accredited for BOD<sub>5</sub>/CBOD<sub>5</sub>, Chlorine (residual), DO, pH, TSS, and fecal coliform.

## **OTHER PERMIT CONDITIONS**

### ***REPORTING AND RECORDKEEPING***

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

### ***PREVENTION OF FACILITY OVERLOADING***

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

### ***OPERATION AND MAINTENANCE (O&M)***

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

### ***RESIDUAL SOLIDS HANDLING***

To prevent water quality problems, the Permittee is required in permit Condition S7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State water quality standards.

The final use and disposal of sewage sludge from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW and Chapter 173-308 WAC. The disposal of other solid waste is under the jurisdiction of the Pierce County Health Department.

### ***PRETREATMENT***

#### ***Federal and State Pretreatment Program Requirements***

Under the terms of the addendum to the “Memorandum of Understanding between Washington Department of Ecology and the United States Environmental Protection Agency, Region 10” (1986), the Department of Ecology (Department) has been delegated authority to administer the Pretreatment Program (i.e. act as the Approval Authority for oversight of delegated Publicly Owned Treatment Works (POTWs)). Under this delegation of authority, the Department has exercised the option of issuing wastewater discharge permits for significant industrial users discharging to POTWs which have not been delegated authority to issue wastewater discharge permits.

There are a number of functions required by the Pretreatment Program which the Department is delegating to such POTWs because they are in a better position to implement the requirements (e.g. tracking the number and general nature of industrial dischargers to the sewerage system).

The requirements for a Pretreatment Program are contained in Title 40, Part 403 of the Code of Federal Regulations. Under the requirements of the Pretreatment Program (40 CFR 403.8(f)(1)(iii)), the Department is required to approve, condition, or deny new discharges or a significant increase in the discharge for existing significant industrial users (SIUs) [40 CFR 403.8 (f)(1)(i)].

The Department is responsible for issuing State Waste Discharge Permits to SIUs and other industrial users of the Permittee's sewer system. Industrial dischargers must obtain these permits from the Department prior to the Permittee accepting the discharge (WAC 173-216-110(5)). (Industries discharging wastewater that is similar in character to domestic wastewater are not required to obtain a permit. Such dischargers should contact the Department to determine if a permit is required.) Industrial dischargers need to apply for a State Waste Discharge Permit sixty (60) days prior to commencing discharge. The conditions contained in the permits will include any applicable conditions for categorical discharges, loading limitations included in contracts with the POTW, and other conditions necessary to assure compliance with State water quality standards and biosolids standards.

The Department requires this POTW to fulfill some of the functions required for the Pretreatment Program in the NPDES permit (e.g. tracking the number and general nature of industrial dischargers to the sewage system). The POTW's NPDES permit will require that all SIUs currently discharging to the POTW be identified and notified of the requirement to apply for a wastewater discharge permit from the Department. None of the obligations imposed on the POTW relieve an industrial or commercial discharger of its primary responsibility for obtaining a wastewater discharge permit (if required), including submittal of engineering reports prior to construction or modification of facilities [40 CFR 403.12(j) and WAC 173-216-070 and WAC 173-240-110, et seq.].

#### *Wastewater Permit Required*

RCW 90.48 and WAC 173-216-040 require SIUs to obtain a permit prior to discharge of industrial waste to the Permittee's sewerage system. This provision prohibits the POTW from accepting industrial wastewater from any such dischargers without authorization from the Department.

#### *Duty to Enforce Discharge Prohibitions*

This provision prohibits the POTW from authorizing or permitting an industrial discharger to discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass-through or interference. The definitions of pass-through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the POTW from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, wastes with excessive BOD, petroleum-based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the POTW receives prior authorization from the Department. The discharges include cooling water in significant volumes, stormwater and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

*Support by the Department for Developing Partial Pretreatment Program by POTW*

The Department has committed to providing technical and legal assistance to the Permittee in fulfilling these joint obligations, in particular, assistance with developing an adequate sewer use ordinance, notification procedures, enforcement guidelines, and developing local limits and inspection procedures.

*OUTFALL EVALUATION*

Proposed permit Condition S.11 requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to determine if sediment is accumulating in the vicinity of the outfall.

*GENERAL CONDITIONS*

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

**PERMIT ISSUANCE PROCEDURES**

*PERMIT MODIFICATIONS*

The Department may modify this permit to impose numerical limitations, if necessary, to meet water quality standards, sediment quality standards, or ground water standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

*RECOMMENDATION FOR PERMIT ISSUANCE*

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the state of Washington. The Department proposes that this permit be issued for five (5) years.

## REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.
1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.
1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.
1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third Edition.

Tsivoglou, E.C., and J.R. Wallace.

1972. Characterization of Stream Reaeration Capacity. EPA-R3-72-012. (Cited in EPA 1985 op.cit.)

Washington State Department of Ecology.

Laws and Regulations (<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information  
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

1994. Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

Wright, R.M., and A.J. McDonnell.

1979. In-stream Deoxygenation Rate Prediction. Journal Environmental Engineering Division, ASCE. 105(EE2). (Cited in EPA 1985 op.cit.)

## APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page one of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on January 22, 2004, and January 29, 2004, in the *Tacoma News Tribune* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on May 20, 2005, in the *Tacoma News Tribune* to inform the public that a draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments were mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Northwest Regional Office  
3190 160<sup>th</sup> Avenue SE  
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone (425) 649-7062, or by writing to the address listed above.

The permit and fact sheet were written by Bernard Jones.



## APPENDIX B—GLOSSARY

**Acute Toxicity**--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

**AKART**--An acronym for “all known, available and reasonable methods of prevention, control, and treatment.”

**Ambient Water Quality**--The existing environmental condition of the water in a receiving waterbody.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in waste water. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect waste water.

**Average Monthly Discharge Limitation**--The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

**Average Weekly Discharge Limitation**--The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Best Management Practices (BMPs)**--Schedules of activities; prohibitions of practices; maintenance procedures; and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**CBOD<sub>5</sub>**--The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD<sub>5</sub> is given in 40 CFR Part 136.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Combined Sewer Overflow (CSO)**--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

**Construction Activity**--Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

**Continuous Monitoring**--Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the waste water. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated waste water and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

**Industrial User**--A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business; from the development of any natural resource; or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Infiltration and Inflow (I/I)**--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

**Interference**--A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

- Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and
- Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) [including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA], sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

**Major Facility**--A facility discharging to surface water with an EPA rating score of >80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of <80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the state of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and federal laws.

**Pass-through**--A discharge which exits the POTW into waters of the state in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Potential Significant Industrial User**--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day; or
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass-through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

**Quantitation Level (QL)**--A calculated value five times the MDL (method detection level).

**Significant Industrial User (SIU)**--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N; and
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority\* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority\* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

\*The term "Control Authority" refers to the Washington State Department of Ecology in the case of nondelegated POTWs or to the POTW in the case of delegated POTWs.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a stormwater drainage system into a defined surface waterbody, or a constructed infiltration facility.

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

### **APPENDIX C—TECHNICAL CALCULATIONS**

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

# Mixing Zone Model Output - ACEC

```

Sep 6, 1996, 17: 3:53 ERL-N PROGRAM PLUMES, Ed 3, 3/11/94 Case: 4 of 4
Title stratified; average current; .3MGD nonlinear
tot flow # ports port flow spacing effl sal effl temp far inc far dis
0.02015 2 0.01007 5.608 0.0 17.5 5 100
port dep port dia plume dia total vel horiz vel vertl vel asp coeff print frq
17.68 0.2032 0.1587 0.5093 0.5093 0.000 0.10 500
port elev ver angle cont coef effl den poll conc decay Froude # Roberts F
1.524 0.0 0.61 -1.24985 100 0 2.616 7.865
por angle red space p amb den p current far dif far vel K:vel/cur Stratif #
90 5.608 23.0741 0.1500 0.0003 0.15 3.395 0.0004224
depth current density salinity temp amb conc N (freq) red grav.
0.0 0.15 21.9294 28.16 8.1 0.0 0.02491 0.2388
5.0 0.15 22.6891 29.15 8.2 0.0 buoy flux puff-ther
10.0 0.15 22.8063 29.3 8.2 0.0 0.0004291 0.4178
15.0 0.15 22.9485 29.5 8.3 0.0 jet-plume jet-cross
20.0 0.15 23.1829 29.8 8.3 0.0 0.3908 0.4776
plu-cross jet-strat
0.7130 1.696
plu-strat
3.532
hor dis>=

```

RMIX1 flow category algorithm is turned off.

m, 16.40 ft >0.0 to any m range

lp: F1. Quit: <esc>. Configuration:ATNO0. FILE: MCNEIL.VAR;

INITIAL DILUTION CALCULATION (nonlinear mode)

lume dep plume dia poll conc dilution hor dis

m	m			m
17.68	0.1587	100.0	1.000	0.000

16.32	1.477	3.125	31.26	2.542
-------	-------	-------	-------	-------

13.02	5.629	0.2559	381.5	12.60 -> merging
-------	-------	--------	-------	------------------

12.53	6.408	0.2093	466.4	15.08 -> trap level
-------	-------	--------	-------	---------------------

11.25	9.124	0.1362	716.8	29.35
-------	-------	--------	-------	-------

> local maximum rise or fall

RFIELD CALCULATION (based on Brooks, 1960, see guide)

rfield dispersion based on wastefield width of 14.73m

--4/3 Power Law-- -Const Eddy Diff-

conc	dilution	conc	dilution	distance	Time	
				m	sec	hrs
0.1356	719.9	0.1356	719.9	30.00	4.301	0.0
0.1360	718.1	0.1360	718.1	35.00	37.63	0.0
0.1361	717.6	0.1361	717.6	40.00	70.97	0.0
0.1361	717.3	0.1361	717.4	45.00	104.3	0.0
0.1361	717.2	0.1361	717.2	50.00	137.6	0.0
0.1361	717.2	0.1361	717.2	55.00	171.0	0.0
0.1361	717.5	0.1361	717.3	60.00	204.3	0.1
0.1359	718.3	0.1360	717.8	65.00	237.6	0.1
0.1357	719.7	0.1359	718.6	70.00	271.0	0.1
0.1353	721.9	0.1357	719.8	75.00	304.3	0.1
0.1348	724.7	0.1353	721.6	80.00	337.6	0.1
0.1341	728.3	0.1350	723.7	85.00	371.0	0.1
0.1334	732.6	0.1345	726.2	90.00	404.3	0.1
0.1325	737.5	0.1340	729.1	95.00	437.6	0.1
0.1315	743.1	0.1334	732.3	100.0	471.0	0.1

### Mixing Zone Model Output - CCEC

```

31, 1996, 16:42:30 ERL-N PROGRAM PLUMES, Ed 3, 3/11/94 Case: 12 of 12
le POP. 2605; MAX DAY W/O I&I; 0.73MGD; STRAT., LOW CURRENT nonlinear
t flow # ports port flow spacing effl sal effl temp far inc far dis
.03198 2 0.01599 5.608 0.0 18.33 5 100
ort dep port dia plume dia total vel horiz vel vertl vel asp coeff print frq
17.68 0.2032 0.1587 0.8083 0.8083 0.000 0.10 500
t elev ver angle cont coef effl den poll conc decay Froude # Roberts F
1.524 0.0 0.61 -1.40269 100 0 4.138 0.01167
angle red space p amb den p current far dif far vel K:vel/cur Stratif #
90 5.608 23.0741 0.02000 0.0003 0.02 40.42 0.0004198
depth current density salinity temp amb conc N (freq) red grav.
0.0 0.02 21.9294 28.16 8.1 0.0 0.02491 0.2404
5.0 0.02 22.6891 29.15 8.2 0.0 buoy flux puff-ther
10.0 0.02 22.8063 29.3 8.2 0.0 0.0006854 1.295
15.0 0.02 22.9485 29.5 8.3 0.0 jet-plume jet-cross
20.0 0.02 23.1829 29.8 8.3 0.0 0.6183 5.684
plu-cross jet-strat
480.5 2.136
plu-strat
3.971
hor dis>=

```

4IX1 flow category algorithm is turned off.

n, 16.40 ft >0.0 to any m range

p: Fl. Quit: <esc>. Configuration:ATN00. FILE: MCNEILIS.VAR;

INITIAL DILUTION CALCULATION (nonlinear mode)

time dep plume dia poll conc dilution hor dis

m	m			m
17.68	0.1587	100.0	1.000	0.000

12.29	1.799	3.125	31.26	3.068
-------	-------	-------	-------	-------

4.263	4.102	0.9163	106.6	4.745 -> trap level
-------	-------	--------	-------	---------------------

2.354	5.740	0.7391	132.1	5.242 -> merging
-------	-------	--------	-------	------------------

1.978	7.038	0.6993	139.7	5.393 -> begin overlap
-------	-------	--------	-------	------------------------

FIELD CALCULATION (based on Brooks, 1960, see guide)

field dispersion based on wastefield width of 12.65m

--4/3 Power Law-- -Const Eddy Diff-

conc	dilution	conc	dilution	distance	Time	AMZ D.F.C
				m	sec	hrs 7.9m = 139.9
0.6973	140.1	0.6980	139.9	10.00	230.4	0.1
0.6649	147.0	0.6787	144.0	15.00	480.4	0.1
0.6095	160.7	0.6456	151.6	20.00	730.4	0.2
0.5522	177.8	0.6110	160.3	25.00	980.4	0.3
0.4997	196.8	0.5791	169.3	30.00	1230	0.3
0.4537	217.1	0.5507	178.2	35.00	1480	0.4
0.4136	238.4	0.5255	186.9	40.00	1730	0.5
0.3788	260.6	0.5031	195.4	45.00	1980	0.6
0.3484	283.7	0.4833	203.6	50.00	2230	0.6
0.3218	307.4	0.4655	211.5	55.00	2480	0.7
0.2983	331.9	0.4494	219.2	60.00	2730	0.8
0.2775	357.0	0.4348	226.6	65.00	2980	0.8
0.2590	382.8	0.4216	233.9	70.00	3230	0.9
0.2425	409.1	0.4094	240.9	75.00	3480	1.0
0.2276	436.0	0.3982	247.8	80.00	3730	1.0
0.2142	463.6	0.3880	254.4	85.00	3980	1.1
0.2020	491.7	0.3785	260.9	90.00	4230	1.2
0.1910	520.3	0.3696	267.2	95.00	4480	1.2
0.1809	549.4	0.3613	273.5	100.0	4730	1.3



## NPDES Permit No.

3/18/2005 9:05 AM  
Copy of MCNeil.s.tsdcalc11.xls

[illegible]

AMMONIA CONVERSION SPREADSHEET  
Total to Unionized

Calculation of seawater fraction of un-ionized ammonia  
from Hampson (1977). Un-ionized ammonia criteria for  
salt water are from EPA 440/5-88-004.

Lotus File NH3SALT.WK1 Revised 19-Oct-93

---

INPUT

1. Temperature (deg C):	12.0
2. pH:	8.0
3. Salinity (g/Kg):	29.3

---

OUTPUT

1. Pressure (atm; EPA criteria assumes 1 atm):	1.0
2. Molal Ionic Strength (not valid if >0.85):	0.602
3. pKa8 at 25 deg C (Whitfield model "B"):	9.315
4. Percent of Total Ammonia Present as Unionized:	1.803%
5. Unionized ammonia criteria (mg un-ionized NH3 per liter) from EPA 440/5-88-004	
Acute:	0.233
Chronic:	0.035
6. Total Ammonia Criteria (mg/L as NH3)	
Acute:	12.92
Chronic:	1.94
7. Total Ammonia Criteria (mg/L as NH3-N)	
Acute:	10.62
Chronic:	1.60